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ABSTRACT

Graduate students are often assigned teaching responsibilities as part of an assistantship, but most have had very little or no formal teaching experience. This digest summarizes some of the literature and resources available to support graduate assistants in their teaching roles. Sections include: (1) "Attention to How Students Learn"; (2) "Learner Motivation"; (3) "Instructional Strategies"; (4) "Instructional Media"; and (5) "World Wide Web Resources." (CCM)

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Guidelines for College Science Teaching Assistants

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Graduate students are often assigned teaching responsibilities as part of an assistantship, but most have had very little or no formal teaching experience. This digest summarizes some of the literature and resources available to support graduate assistants in their teaching roles. Some major considerations when teaching college students include: effective instructional strategies, characteristics of college learners, and finding resources that provide a background for understanding the teaching and learning process.

Attention to How Students Learn

At the college level, cognitive approaches to learning tend to be favored. These approaches are based on the assumption that complex cognitive factors promote or hinder one's ability to learn and act on information. The content is often complex and cognitive processes are often emphasized in science courses. Therefore cognitive psychologists suggest that instructors focus on integrating new information into existing frameworks that learners have already constructed for themselves based on previous experience and education. When there is little prior exposure or experience with the subject matter, new frameworks are constructed by learners. Bruning (1994) and Casazza & Silverman (1996) outline useful applications of learning theory to college teaching.

Svinicki (1991) described six central ideas of cognitive learning theories and their implications for instructors. Briefly, they can be summarized as:

1. Instructors should emphasize and be clear about the information to be learned and why it is important.
2. Learners and instructors should strive to act on new information to make such information more understandable. This includes the use of numerous examples, illustrations, extended assignments, and references to previous content and experiences.
3. Learners commit information to long term memory according to their current understanding of major concepts. The instructor should facilitate ways of organizing knowledge by demonstrating ways they have organized content for greater understanding. Instructors can also encourage learners to create their own ways of organizing new information.
4. Learners need to revisit and re-evaluate new knowledge with an emphasis on refining and revising concepts that should be retained. Instructors can offer opportunities for learners to self-check and evaluate their understanding of new concepts and ideas.
5. Transfer of learned material is not automatic but can be facilitated by continued application of new knowledge and by applying it to new situations and contexts.
6. Learning is greatly enhanced when people are aware of specific strategies that work for them. Learners also benefit by monitoring their use of such strategies. Instructors should emphasize strategies that help translate new information into memory.

Svinicki (1994) also advocates the activation of prior knowledge by using pre-assessment checklists, pretests, and brainstorming to discover learner misconceptions and level of understanding. Instructors can give examples of organizing content into outlines, flowcharts, concept maps, and diagrams that link concepts using descriptive words. Instructors can encourage learners to describe how they use specific problem solving steps and how they organize new information into their existing frameworks for themselves.

Learner Motivation

The role of social communities and internal motivation is also emphasized by cognitive psychologists. Pintrich (1994) and Perry, Menec, & Struthers (1996) state that motivation is influenced by classroom environmental factors, as well as by internal characteristics of learners. Student beliefs and perceptions do influence their ability to learn in college situations. The ability to have some input in the learning environment, an understanding of the expectations and goals of the course and instructor, the use of suitable and varied instructional strategies, and the instructor's own behavior all impact learner motivation. Some students require greater attention and emotional support from instructors (Wlodkowski & Ginsberg, 1995).

McLoed (1996) describes "deep learning states" or more effective periods of learning that are often facilitated by a decrease in stress and an increase in interpersonal exchanges in learning situations. Instructors can strive to create learning environments that promotes "open reflection" where learner ideas may be expressed and questions may be asked. Superficial learning does not offer many such interactions or opportunities for learner – instructor interactions.

Instructional Strategies

Using a variety of instructional strategies provides opportunities for students to learn new and difficult information in their preferred learning modalities. By varying instructional methods, teachers are more apt to increase the engagement and motivation of students. Typically, the major instructional strategies used in college classrooms are discussion, lecture, experiential learning, and case studies.

Following is a summary of the advantages of using each strategy:

Lectures are used to update information on current research relevant to a topic, summarize knowledge scattered over a variety of sources, convey factual information, provide structures to help students read more effectively, or hone note-taking skills. Research shows that students who take notes remember material better (McKeachie, 1994).

Discussion is used to give students an opportunity to apply principles, formulate problems, and learn to evaluate the logic and evidence for their own positions and those of others. Participating in meaningful discussions helps students think about relationships among concepts by talking, explaining, summarizing or questioning the relationships (McKeachie, 1994).

Experiential learning is used in a vriety of science settings, including: field work, internships, and cooperative learning situtations. Experiential learning episodes have specified transferable outcomes which help students describe and understand real-life problems. This strategy links learning, thinking, and doing. Useful related strategies include peer learning, peer tutoring and student led discussions (McKeachie, 1994).

Case studies are used to represent a particular principle or type of problem. Cases are used in a variety of fields, along with simulations and games, to involve students in solving actual problems. Case studies involve acquiring, recalling, and using information, or applying theory learned in class in order to solve problems (McKeachie, 1994).

Instructional Media

Instructional media comprises the tools a teacher has available to enhance his or her presentation. The use of media is determined by an instructor's objectives. Researchers have found that the use of media can motivate students to learn. Some guidelines and uses of media follow.

Video is an excellent tool to demonstrate or illustrate a point or procedure that can not easily be replicated in the classroom. When using video, study the program in advance and create a set of questions to encourage critical viewing by your students. Provide an outline of the video's main points. Project only the segments of the video that pertain to the points being made, and discuss the program with your students (Hacbarth, 1996).

Visual aids such as transparencies, models, or slides are standard in college instruction. When using transparencies it is best to prepare them in advance, keeping the content simple by presenting one idea per slide. Information should be limited to six words per line and six lines per transparency, always making sure that images are clear and the text is legible. Leave the light on in the classroom since students will need to take notes from the transparencies, and consider giving students a paper copy of the transparencies in advance (Hacbarth, 1996).

Use of the *Internet* provides many unique opportunities and resources to facilitate learning. The Internet enables greater collaboration, communication, and informational support through use of e-mail, listservs, newsgroups, search engines, and World Wide Web sites. The Internet can be used to create a virtual learning community within your classroom through and active exchange of ideas (Hacbarth, 1996).

Final Thoughts

Typically, the main concern of graduate students is how to become scholars in their disciples of choice. While teaching assistantships are seen a a source of financial support, graduate teaching associates have a responsibility to improve their teaching skills, as all good professional educators do. Reading about teaching, attending workshops and seminars, joining conversation groups to talk about teaching, and exploring educational resources on the Inernet are all excellent ways to improve one's teaching skills.

WWW Resources

Resources for Teaching Assistants
http://www.uni.edu/walsh/teach.html

Guidelines for Teaching Assistants
http://www.trentu.ca/academic/graduate/taguide.html

Reading List for Teaching Assistants
http://www.adm.uwaterloo.ca/infotrac/liblst2.html

Notes and Suggestions for TAs
http://server-mac.pas.rochester.edu/yigal/TA-notes.html

Guidelines for Web Based Instruction
http://planetx.bloomu.edu/~jsewar2/lesson1.html

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